STANFORD RESEARCH ASSOCIATES DISCUSSION

San Francisco, 9 November 1960

1. Acknowledgements
2. Non-political
3. Pattern of Talk -- a bit of past history -- an examination of the present -- a look at the future -- and, an evaluation of our competitive standing in this business.
4. Before doing this -- let me attempt to characterize the business -- NASA, not military departments.
   a. Strange animal - nothing quite like it in government or industry
   b. R & D with information - new knowledge - the principal, indeed the only real product.

c. Know that information - and the techniques developed to acquire it - will lead, most certainly, to new systems, new products, even to the more adequate meeting of defense requirements by the military. For example, in meteorology, and communications.

d. But, the fact remains - we are not attempting to make bombs, missiles, operational communications or weather forecasting systems.

e. We are charged with - "the expansion of human knowledge of phenomena in the atmosphere and space".

Then we are admonished to make available to the military whatever we may find having "military value or significance" and to "provide for the widest practicable and appropriate dissemination of information concerning our activities and the results thereof".

f. So I repeat again - we are a strange operation in government with only an R & D mission to undertake activities in space for peaceful purposes for the benefit of all mankind.

5. Now for a look at the past

a. Space Act passed and signed 29 July 1958.

b. Sworn in 19 August -
started work 9 Sept.

c. Open for business as NASA
1 October 1958, just two
years ago.

d. 8000 employees then -
19,000 approx. today

e. Sept. 30, 1958 - $101,000,000
Oct. 1, 1958 - 335,000,000 FY 1959
FY 1960 - 524,000,000
FY 1961 - 915,000,000 supplemental

f. Plant - 6 large installations
and 3 small - that are
spread from the east to
the west coast and from
the Great Lakes to Alabama.

g. Remember - only R & D

h. What other business has:
180 million stockholders
600 directors
Not to mention the press

i. Moreover of this current billion dollar budget 75 to 80% is going outside of government to the industry.

6. This growth of NASA has been matched by a parallel growth within the Department of Defense. Together these resources have enabled the United States to successfully launch

27 satellites - 14 still up
2 probes into orbit about the sun
2 capsules recovered from orbit

7. By comparison USSR has launched

6 satellites - 1 still up
1 probe into orbit about the sun
1 probe that has impacted the moon
1 capsule recovered from orbit

8. Caution against simple scorekeeping even if satisfying to ego of U. S. Neither the numbers game nor the

weight lifting game will determine the program's ultimate worth to the nation and the world — only solid achievement can do that.

9. Where are we at present?

   a. Have an organization - excellent people and maturing as an organizational entity.

   b. Have worked out relationship with military to reasonable satisfaction of both sides - AACB.

      Press presently attempting to whip up antagonisms.

   c. Have worked out long-range plan which permits focussing of our energies and

resistance to pressures of hysteria or special interest groups.

d. Expect to launch this calendar year spacecraft of various types in support of balanced, well-planned program involving manned flight in space, scientific research in space environment, applications of space technology to useful purposes as in meteorology and communications.

e. Have begun to make apparent the character and quality of our program by recent experiments - successes for which we are grateful.

f. Have better understanding of magnitude of task as we start analyzing data and drawing conclusions.

10. Brief analysis of 3 major accomplishments this year in Pioneer V, Tiros I, Echo.

a. Pioneer V

22,500,000 miles - first real success in long lived, long distance communication - problems uncovered.

b. Tiros I

22,300 pictures over 8 months of active life - surprizing - Tiros II - Using agencies collaborate

c. Echo - describe - samples of material - wrinkled - transmission.
Delta vehicle
112,000# weight
150 thousand # thrust
to put 150# into orbit

d. Courier - active satellite repeater - DOD development

e. Transit - navigation satellite - DOD development

11. What of future?

a. Continuing program -
1.25, 1.5, 2.0 billion

b. Vehicle program -
Scout, Agena, Centaur,
Saturn, Nova class,
Rover - 10 now but
should reduce to 5 -
military use.

c. Two flights per month

d. Manned flight - not a
stunt, not undertaken
to beat Russians and
why, do not intend to
stop if they are first -
only first step - and
necessary to determine
future program -
Apollo study contracts
awarded.

e. Applications - meteorology,
passive and active communications.

f. Exploration - lunar, Mars, Venus

g. Highlights of next 10 years

Highlights of next year's plan include an orbital flight of an astronaut in the Mercury capsule, and the first launching of the Atlas-Centaur launch vehicle.

Early in 1962, we should launch the first lunar impact spacedraft and later in the year the first instrumented probe into the vicinity of Venus or Mars.

In the 1962 - '63 period, we have targeted the first two and three stage launchings of Saturn.

The three stage version of this vehicle will have a 20,000-pound low orbit payload capability.

In 1963, we plan the first launching of an unmanned vehicle for a controlled landing on the moon and the first launching of an orbiting astronomical observatory.

Before the end of '64, we expect to send a vehicle around the moon and bring it back to earth and to make our first unmanned reconnaissance of Venus or Mars,or both.

For 1965, we are pushing for the first flight

test of a nuclear second stage vehicle.

In the 1965-67 period, we will begin the launching series leading to manned circumnavigation of the moon and the establishment of a near-earth space station.

Early in the '70's, we will be expecting to land a man on the moon.

12. Where do we stand with USSR?

a. Compete across the board- space is glamorous, visible, exciting - one in which spectaculars have been reserved, very largely to USSR.

b. In space -

-USSR ahead in thrust & why

-US doing well otherwise -

scientific output - broad-based program

-May change any day if the Soviets produce another spectacular - only pattern discernible about Russian activities is massive assault on difficult problems of manned flight at present - so would I.

-Competition vs race - if we follow USSR must always be second.

13. Having given you this picture - you may well ask - Why - Why are we spending this money - going at this rate - To what end?

a. Competition - but this is valid only so long as the competition is apparent - so long as competition lasts.

b. Cash return - yes, but only in the wake of achievement -

communications, meteorology, navigation.

c. Human curiosity about things scientific - the desire to probe the unknown - has motivated human curiosity through the ages. In reality, this is the basic reason we now look toward the moon with envious eyes and are building the transportation systems to get there.

d. All useful products, our industrial developments and our national strength, economically and militarily, have arisen out of the intangible, often times seemingly wild-eyed dreams of men seeking, in the first instance, only to satisfy

their curiosity or to increase human understanding of the physical world about them.

e. My colleague, Hugh Dryden, often says that man learned to fly because he envied the birds. Certainly, the Wright brothers had no real vision of the great airliners that ply the skies today - of the military defense of this nation being dependent, substantially, on our capabilities in military aviation. Nor did they foresee the importance of the airplane in bringing nations together in time and space with

the opportunity thus provided - though not yet exploited - for increased understanding and friendship between peoples.

f. In the words of another colleague, Wernher von Braun:

"The same mechanism will operate as we proceed to explore and exploit the space environment. We know that the process will widen man's sphere of action. It will increase his knowledge. It will open the last frontier. No one can foretell all the benefits that may accrue. We simply cannot imagine,

with minds limited by tradition, knowledge and experience to earthbound concepts, what will be the total effects upon national growth, virility and productivity.

"Winston Churchill once said that the destiny of mankind is not decided by material computation. When great causes are on the move, as he added, we learn that we are spirits, not animals, and that something is going on in space and time and beyond space and time which spells duty."

We who are involved in this challenging enterprise

feel a high sense of
duty to demonstrate the
ability of free men to
assume clearly recognized
leadership in the
exploration of space as
in all other areas of scientific
and technological progress.